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## 20. FISHES OF NAMBIYAR RIVER, KALAKAD-MUNDANTHURAI TIGER RESERVE, TAMIL NADU

Kalakad-Mundanthurai Tiger Reserve (KMTR) is located at the southernmost tip of the Western Ghats. Several streams originate and drain into the major east-flowing perennial river Tamiraparani. Johnsingh and Wickram (1987) reported freshwater fishes from the Kalakad-Mundanthurai Wildlife Sanctuary with a notable exception on the Nambiyar river, a separate river basin with several tributaries in the KMTR. Documentation is needed due to the threats to the river system and fish fauna. The present survey is a study of the fish diversity in the Western Ghats streams under the Western Ghats Biodiversity Programme.

Nambiyar river is one of the east-flowing rivers in Nanguneri taluka, Tirunelveli dist., Tamil Nadu, forming a minor river basin. This river originates in the eastern slopes of the Western Ghats at 1650 m above msl in the Kalakad Reserve Forest. It is drained by two major tributaries viz., Thamarayar and Parattaiyar. The 48 km long river flows a distance

of 9.6 km in the hilly regions before it confluences with the Bay of Bengal. The river has nine anicuts/weirs (check dams) and 40 wetlands. Due to multiple impoundments along its course, it reaches the Bay of Bengal only during monsoon.

Fishes were collected from two sites, covering upstream and downstream regions in Nambiyar river, using various mesh sizes of monofilamentous gill nets, drag nets and scoop nets. The colour spots and other important characters of the catch were noted, and the specimens preserved in 10% formalin. In larger specimens, 2-5 ml formalin was injected into the abdomen.

In Nambiyar river, 14 species of 2 orders, 8 families and 13 genera were recorded (Table 1). All the species are known from the Western Ghats of South India (Talwar & Jhingran 1991), however, this is the first report on these fishes from the Nambiyar river system. Among the species caught, the air-breathing *Channa* sp. and

TABLE I  
FISH SPECIES AND THEIR CURRENT STATUS IN NAMBIYAR RIVER

	Fish Species	Current Status		Fish Species	Current Status
I	Order: Cypriniformes		iii.	Family: Cobitidae	
i.	Family: Cyprinidae		h	Genus: <i>Lepidocephalus</i>	
a	Genus: <i>Puntius</i>		9.	<i>Lepidocephalus thermalis</i> (Val.)	Not assessed
1.	<i>Puntius arenatus</i> (Day)	Not assessed	II	Order: Siluriformes	
2.	<i>Puntius chola</i> (Ham.-Buch.)	Vulnerable	iv	Family: Bagridae	
b	Genus: <i>Amblypharyngodon</i>		i.	Genus: <i>Mystus</i>	
3.	<i>Amblypharyngodon microlepis</i> (Bleeker)	Not assessed	10.	<i>Mystus armatus</i> (Day)	Not assessed
c	Genus: <i>Danio</i>		v	Family: Aplocheilidae	
4.	<i>Danio aequipinnatus</i> (McClelland)	Low risk, near threatened	j	Genus: <i>Aplocheilus</i>	
d	Genus: <i>Esomus</i>		11.	<i>Aplocheilus lineatus</i>	Not assessed
	<i>Esomus thermoicos</i> (Val.)	Not assessed	vi	Family: Cichlidae	
e	Genus: <i>Parluciosoma</i>		k	Genus: <i>Oreochromis</i>	
6.	<i>Parluciosoma daniconius</i> (Ham.-Buch.)	Low risk, near threatened	12.	<i>Oreochromis mossambica</i> (Peters)	Not assessed
f	Genus: <i>Garra</i>		vii	Family: Belontiidae	
7.	<i>Garra mullya</i> (Sykes)	Not assessed	l	Genus: <i>Macropodus</i>	
ii	Family: Parapsilorhynchidae	Not assessed	13.	<i>Macropodus cnpanus</i> (Val.)	Not assessed
g	Genus: <i>Nemacheilus</i>		viii	Family: Channidae	
8.	<i>Nemacheilus triangularis</i> Day	Low risk, least concern	m	Genus: <i>Channa</i>	
			14.	<i>Channa punctatus</i> (Bloch)	Low risk, near threatened

catfish *Mystus armatus* are of major importance for fishery. Other small species are of minor interest. Introduction of *Oreochromis* is a threat to the native fauna.

The Nambiyar river is disturbed by anthropogenic activity, due to the pilgrim sites upstream, which is highly disturbed by the washing, bathing and other activities of the pilgrims and tourists. The headwater stream has midstory and overstory trees, but the lowland riparian vegetation has been altered by agricultural farms. Agricultural effluent is a major threat to the ecosystem in the lowland. Diversion of small streams for irrigation upstream is also a major threat to the stream habitats and fish fauna of the Nambiyar river.

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## 21. A PROFILE OF THE FOOD AND FEEDING OF HILLSTREAM TELEOSTS OF GARHWAL HIMALAYAS

Hillstreams of the Garhwal Himalayas are either glacier- and snow-fed (mostly larger and perennial streams such as Yamuna, Tons, Bhagirathi, Alaknanda, Mandakini, Pindar), nonglacier- and/or spring-rain-fed. Almost all the hillstreams of the Garhwal Hills (especially in their meta- and hyporhithron zones) harbour abundant and diverse ichthyofauna, reflecting a diversity of habitat, food and location of migratory routes.

### Occupied Habitats

The category of hillstream fishes, based on feeding habits, are:

1. Surface feeders, e.g. *Barilius bendelisis*, *B. vagra*, *B. barila*, *B. barna*, *Xenentodon cancila* and *Esomus dauricus*.

2. Column feeders, e.g. *Schizothoraichthys progastus*, *Puntius chola*, *P. sophore* and *P. sarana*, and

3. Bottom feeders, e.g. *Schizothorax plagiostomus*, *S. richardsonii*, *Garra* spp., *Crossocheilus latius latius*, *Glyptothorax* spp. and *Pseudecheneis sulcatus*.

There is no convincing method of differentiating the feeding sites from non-feeding sites. It may be indirectly inferred from observations on gut contents and seasonal variations of feeding.

Das and Moitral (1963, 1965) classified the feeding habits of fishes from the Central Himalayan streams (including Garhwal Himalaya) as: i. Herbivorous (75% of food is plant material), ii. Omnivorous (plant and animal material approximately 50% each), and iii. Carnivorous (animal material constitutes over

75%). Later, two categories were added, Herbi-omnivorous (greater amount of plant material) and Carni-omnivorous (a greater amount of animal material). Twenty-seven teleost species from Garhwal Himalaya have been classified according to their feeding habits (1993) (Table 1).

According to Nikolsky's (1963) scheme, based on variation in the type of food consumed, most fishes from Garhwal rivers (especially the 27 reviewed in Table 1) are either euryphagic (take a wide variety of food items) or stenophagic (feed on few types of food) except a few, viz. *Pseudecheneis sulcatus*, *Glyptothorax pectinopterus*, *G. conirostris*, *G. telchitta* which feed only on a single category of food, e.g. larvae and nymphs of aquatic insects.

### Peculiar features and adaptations for food selection

The basic morphology of the feeding apparatus, common to all teleosts, differs in form according to the species, and is adapted to a particular mode of feeding (Larkin 1979). The primary feeding adaptations of herbivore fish are structural in nature. Food capture by carnivores generally requires more elaborate techniques, as potential prey has its own behavioural and structural arrangements for avoiding capture.

Hillstream fishes of Garhwal region live under ecological conditions that may be stressful and less favourable for optimal feeding. These fishes have evolved numerous adaptations to this environment, some of which affect their food gathering and feeding: